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Title

The Role of Migration and Single Motherhood in Children's Education in Mexico

Abstract

I investigate the link between children living in single-parent households and dropping out of school in Mexico. I focus on how migration structures households, bridging distinct literatures describing the role of single parenthood and migration in the educational trajectories of children. Using two waves of the Mexican Family Life Survey (MxFLS), which includes 3,855 school-age children, I longitudinally model how family structure is related to the subsequent risk of dropping out. I find that older children (15-18) in certain types of single-mother households have an increased likelihood of dropping out of school relative to children in two-parent households. Specifically, children living without a father due to international migration or divorce/separation are at an increased risk while those with a domestic migrant father are statistically indistinguishable from their peers.

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Due to the substantial proportion of children growing up with a single parent, numerous studies in the United States and Europe have examined the consequences of single parenthood for children's education (Ginther and Pollak 2004; McLanahan and Sandefur 1994; Borgers, Dronkers, and Van Praag 1996; Kieman 1992). Although there are differences in the magnitude depending on the context, a consistent finding is that children living with a single parent, especially due to divorce, demonstrate worse educational outcomes than children from intact families.

In general, research to date has been mostly limited to the United States and some European countries, focusing on single-mother families due to divorce, pre-marital childbearing, and widowhood, relative to two-parent families. Some effort has been made to compare distinct causes of single parenthood, such as the death of a spouse versus divorce, to better understand variation in the relationship between family structure and children's education (Biblarz and Gottainer 2000; Borgers et al. 1996). However, in a non-U.S./ European context such as Mexico, a non-trivial amount of single motherhood may be attributable to an additional cause – migration.

Mexico, like many other developing countries with substantial levels of migration, contains households divided by both domestic and international borders. To those who are left with children, the migration of a spouse is a distinct pathway to single motherhood, the implications of which are poorly understood. Research has identified the migration of family members to be an important factor in the schooling outcomes of children (Kuhn 2006; Kandel and Kao 2001), but the links between these findings and the broader literature on single parenthood have not been made. These connections are crucial in some contexts as the role of migration in shaping family structure may be equal

to divorce or separation in terms of magnitude, but distinct in terms of consequences for children. In contrast to separation due to marital/relationship disruption, parents separated due to migration are often married and/or in stable relationships. Little research has empirically compared the effect of having an absent parent due to migration to the effects of other types of single-parent families, limiting our understanding of the intersection of migration, family structure, and child development.

In this paper, I extend the literature on single parenthood by explicitly examining the absence of a father due to migration along with separation and divorce in a high migration, non-U.S./European context – Mexico. As the largest sending country of migrants to the U.S., a majority of which are male (Massey, Durand, and Malone 2002), international migration plays an important role in the creation of single-mother households. There is also a substantial level of domestic migration in Mexico's recent history. A study of rural Mexico shows that a quarter of households in the Mexico National Rural Household Survey conducted in 2002 had at least one internal migrant (Taylor and Mora 2006). Due to both domestic and international migration, a substantial number of Mexican children live without a father for at least some period of time during their childhood, with potentially distinct educational consequences.

Although excellent work has considered the direct effect of migration on schooling for children of migrant households in Mexico (Hanson and Woodruff 2003; McKenzie and Rapoport 2006; Kandel and Massey 2002; Kandel and Kao 2001; Kandel and Kao 2000), no work has considered migration to be a distinct case of single motherhood, failing to bridge two distinct but conceptually related literatures – migration and single parenthood. To my knowledge, this is the first attempt to empirically assess

the relative educational (dis)advantage of children living with a single mother due to the father's migration, a single mother due to separation or divorce, or both parents.

Empirical Findings

Single Motherhood and Children's Education

Many, but not all, studies have linked children raised by single mothers with a variety of negative outcomes, including educational achievement, attainment, and school-related behaviors (McLanahan and Sandefur 1994; Manski, Sandefur, McLanahan, and Powers 1992; Astone and McLanahan 1991). More recent work has continued to find that children living with a single parent demonstrate worse educational outcomes than children living with two parents (Anguiano 2004; Heard 2007). Notably, the inclusion of measures of socioeconomic status has been shown to attenuate and, on occasion, eliminate the negative association between single parenthood and children's education (Ginther and Pollak 2004; Biblarz and Gottainer 2000; Biblarz and Raftery 1999; Garasky 1995).

Although living with a single mother has been found to have negative consequences for children's education in several developed countries, studies have shown substantial cross-country variation in the strength of the association between single parenthood and children's education. For instance, the effect of single parenthood on children's educational achievement has been shown to vary substantially in its magnitude even among Western industrialized countries (Pong, Dronkers, and Hampden-Thompson 2003; Hampden-Thompson and Pong 2005) to an extent depending on the degree of welfare provision to single-parent families. These findings highlight the importance of

understanding how specific contextual factors shape the way in which single parenthood is related to children's education.

In this regard, studies of developing countries, which differ contextually from the United States and Europe, will extend our understanding of the educational consequences of growing up with a single mother. Indeed, comparable research in Asia demonstrated striking variation in terms of the role of single parenthood in a child's education. Park (2007) compared five Asian countries and the United States, concluding that the national context is fundamentally important for understanding the effect of single parenthood on children's education. With a number of caveats about sample selection (Indonesia and Thailand) and omitted measures (Japan), Park found children from single-parent families to be advantaged academically over children from two-parent families in Indonesia and Thailand, while single parenthood is negatively associated with children's education in Japan and the United States. No statistically significant relationship was found in Hong Kong or Korea. Park attributed the apparent attenuation in the negative effect of single parenthood in some Asian countries to the presence of strong family ties, which provide economic and social support to single-parent families.

In short, the generally observed negative effect of single parenthood on children's education in the United States and some European countries may not be generalized to other contexts. Of the limited amount of research that explores the role of single motherhood in the education of children outside the United States and Europe, the majority has been focused on Asia (Park 2007); (Jampaklay 2006); (Kuhn 2006). Little research has explored these issues in Mexico, which, considering the demonstrated

variation in outcomes across Asia and between Asia and the U.S./Europe, will provide important insight into a non-Asian developing context.

Parental Migration and Children's Education

Migration of a household member can result in absences of varying lengths, which can temporarily or permanently change the household composition in terms of resident members. In a developing context, with substantial international and domestic migration, this pathway to single parenthood is distinct from others rooted in marital/relationship disruption and non-marital childbearing. However, this distinction is rarely made.

A case in point is Bangladesh, where having a father outside the country was significantly and positively associated with the pace at which children accumulate years of education (Kuhn 2006). In contrast, a study in Thailand using longitudinal data found that children of short-term migrant mothers (<1 year) and/or long-term migrant fathers (2+ years) have reduced odds of being enrolled in school relative to their two-parent peers (Jampaklay 2006). These findings suggest that the role of parental migration in children's education may vary by country context, duration of absence, and type of educational outcome.

In Mexico, research on the role of migration in children's education has come to mixed conclusions. Being in a migrant household was found to be associated with reduced odds of completing junior high school for men and high school for women (McKenzie and Rapoport 2006). Recent findings for rural Mexico have shown household migration to result in a decreased likelihood of enrollment in school (Meza Gonzalez and Pederzini Villarreal 2008). Other findings have contradicted this, showing

that children of immigrant households in Mexico complete significantly more years of education (Hanson and Woodruff 2003).

There is some evidence suggesting that the role of migration in children's schooling varies by the type of migrant – domestic vs. international. In a case study in Mexico, children in domestic migrant households in and around the city of Zacatecas were found to have reduced odds of dropping out of school, which is opposite of their peers in households experiencing international migration to the United States (Kandel 2003). Similarly, studies in South Africa and Bangladesh found a positive or neutral association between domestic migration and educational outcomes for children (Lu and Treiman 2007; Kuhn 2006).

However, research in Mexico has been limited in two specific ways. Firstly, no work contextualizes parental absence due to migration within the broader framework of single parenthood. Instead, studies that do consider migration generally compare migrant households to non-migrant households, independent of household composition. Secondly, research that has explored migration and educational outcomes for children has done so cross-sectionally, preventing the modeling of family structure prior to any changes in the child's enrollment status. This is important as establishing the temporal order requires household composition to be measured prior to any changes in enrollment status of the child.

Theoretical Mechanisms

Literature on single parenthood has attributed the observed educational disadvantage of children in single-parent families relative to their two-parent peers to adverse

economic and social consequences (McLanahan and Sandefur 1994; Bilbarz and Gottainer 2000; Bilbarz and Raftery 1999). The economic consequences of parental absence are fundamentally based on a wealth argument, predicting that children in single-parent families are disadvantaged in terms of financial resources (Nock 1988; Becker 1991). Relative to single-parent households, a two-parent household contains two potential earners. Single-parent households headed by a mother may not have equivalent employment possibilities relative to single-earner male or two-parent, male-headed households. In many countries single-parent, especially single-mother families are more likely to suffer from economic insecurity and poverty than two-parent families (McLanahan 2004). Research has also found that participation in the labor force by single mothers has been linked to an increased likelihood of children working while still in school (Giorguli-Saucedo 2006).

The social consequences of single parenthood stem from two distinct sources. Firstly, children in single-parent households due to relationship disruption (divorce or separation), have often experienced parental conflict prior to the separation which has potentially negative consequences for schooling. This has been supported by research in the U.S. and Europe, which has found children of divorced mothers to be disadvantaged in terms of educational outcomes, relative to their peers that experienced the death of a parent, attributing the difference to the conflict associated with divorce (Bilbarz and Gottainer 2000; Borgers et al. 1996; Kieman 1992; Bosman and Louwes 1988). A second social consequence of parental absence stems from the physical and social barriers to involvement in schooling between non-resident parents and their children. In the U.S., Jeynes (2005) found parental involvement to be important for success in school,

particularly more casual interactions such as discussing school events. Similarly, Aguiano (2004) found parental involvement to be an important predictor of high school graduation.

Overall, the theoretical consequences of single parenthood are economic and social disadvantage for school age children. However, this is based on the paradigm that single parenthood is primarily due to changes in the relationship status of the parent. In a context marked by substantial migration, single parenthood due to migration, often characterized by an absent father, has distinct theoretical implications. Unlike a separation that alters the relationship of the parents such as divorce, migration often involves physical separation, but stability in terms of relationship status. In considering the above theories, the predictions in terms of children's education are less clear.

Economic Consequences of Migration:

In terms of economic consequences, migration could lead to an increase in household assets via remittances as in the Mexican case (Sana and Massey 2005). This explanation has been invoked to explain advantageous educational outcomes for children of international migrants in Bangladesh (Kuhn 2006) and El Salvador (Edwards and Ureta 2003) and domestic migrants in Mexico (Kandel 2003) and South Africa (Lu and Treiman 2007). The overall improvement in household income associated with migration suggests that children with an absent father due to migration might be not as disadvantaged as children with a single mother due to other causes.

Overall, international and domestic migration is expected to be generally beneficial for the household budget and therefore, from a strictly economic perspective, to have a

potentially positive effect on children's education. There is little research distinguishing the relative economic benefits of international and domestic migration. However, the wage differential between migrant sending communities and other parts of Mexico is likely to be smaller than the differential between United States, suggesting that the financial benefit of international migration may be larger. However, in both cases, the general economic consequences for a child's education are theoretically positive.

The Social Consequences of Migration:

Because parental migration does not necessarily involve the conflict often involved in divorce or separation, migration (international or domestic) may not result in similar levels of psychological stress. This distinction has been used to explain better relative educational outcomes for children of divorcees versus children of widows (Biblarz and Gottainer 2000).

However, the physical absence of a parent due to migration may still bear negative social consequences for children's education. Like divorce or separation, the migration of a parent can result in absences of varying lengths, which, when considering school age children, removes a potential source of social support in terms of academics, nutrition, and similarly beneficial guidance. However, there are also potential distinctions to be made within the category of migration. For example, work by Kandel (2003) in Zacatecas, Mexico has shown domestic migration to have no significant relationship with children's education in contrast to international migration which is significantly and negatively associated. Specifically, the social disadvantage could be more relevant for international migrants rather than their domestic equivalents as the barriers are less fluid

and the physical distance greater. Therefore, children in international migrant sending households could experience greater physical separation than their peers in domestic migrant sending households, resulting in greater social disadvantage.

A second potential social consequence stems from a cyclical process, termed the “culture of migration”, in which children who reside in families, households, and communities that are networked directly and indirectly to migration become oriented toward a future move themselves (Kandel and Massey 2002). Built into this orientation are a number of disincentives to continued schooling based largely on the perceived utility for employment in the country of destination and/or the costs of moving (Kandel and Massey 2002). Case studies have found the overall relationship to be negative, suggesting that children in single-mother households due to a father being the U.S. may be at an elevated risk of leaving school compared to their peers in two-parent or single-parent households due to other causes. However, unlike the social consequence of single motherhood based on the social cost of an absent father in terms of support, the role of the culture of migration is likely to differentially affect the process of schooling depending on the age of the child, which will be discussed in more detail below.

In sum, the overall narrative in terms of the social consequences of absent parents due to migration is not straightforward, but generally favors children of domestic migrants relative to their classmates in international migration households or single-mother households due to parental divorce or separation.

[insert table 1 about here]

Economic vs. Social Consequences of Migration

The third and fourth columns of table 1 summarize the distinct theoretical predictions based on the economic and social consequences of single motherhood due to international and domestic migration as well as single motherhood due to divorce/separation. When both the economic and social consequences of parental absence due to migration are considered, its relationship with children's education resists a clear negative or positive prediction. This ambiguity stems from the countervailing economic (positive) and social (negative) associated with parental migration. The net effect is an empirical question, which will determine the general narrative of the role of parental migration in the educational trajectories of children. The prediction for the effects of single motherhood due to migration would be sensitive to context as the relative importance of social vs. economic factors would undoubtedly vary depending both on the context of origin and destination.

In contrast, for separation and divorce, the economic and social consequences are fairly straightforward, resulting in a predicted net negative effect. As a result, children in single-mother households due to divorce or separation are theoretically disadvantaged relative to children in migrant-sending households – both domestic and international.

Age Differences in the Consequences of Migration

Certain theoretical consequences associated with having a migrant father may be more salient for older rather than younger school-age children. These consequences stem from the increased influence of exposure to migration for older children, which are nearer to entry into the labor force and the age at which independent decisions about migration are

likely to be made (Kandel and Kao 2001; Kandel and Kao 2000; Kandel and Kao 2000). In the case of Mexico, exposure to international migration results in a greater likelihood that an individual will aspire to migrate themselves (Kandel and Massey 2002). As the U.S. labor market is perceived to inadequately reward education acquired prior to departure, children approaching the age at which their own migration may be a possibility or the likelihood of it occurring in the near future has begun to solidify, may have a reduced incentive to continue in school (Kandel and Kao 2000).

Kandel and Kao (2000) find that in Zacatecas and surrounding communities, the migration history of a father is positively associated with aspirations to work in the U.S. and negatively associated with aspiring to attend a university suggesting that it is an alternative route to continued educational attainment. Using the same data source Kandel and Massey (2002) find that children of fathers with migration experience are more likely to aspire to migrate themselves. In addition, having aspirations to work in the U.S. is negatively associated with the likelihood of wanting to continue schooling for students in middle school (*secundaria*) and high school (*preparatoria*). Older children are particularly susceptible, as the material cost of schooling, the indirect cost of forgone labor-force participation, and the possibility of independently migrating to the U.S. increases with age. As a result, children approaching working ages (*preparatoria*) are the most likely to have their educational trajectories shaped by the culture of migration.

Notably, the theoretical basis for this effect is derived from the case of international migration. Domestic migration is anchored in the domestic job market, where credentials earned in Mexico are more likely to be adequately valued. Therefore, although no research has considered the transmission of domestic migratory aspirations, the

theoretical consequences are either positive or neutral in terms of children's education. As a result, relative to children in single-mother households due to domestic migration or divorce/separation, the negative social consequences of being in a single-mother household due to international migration are theoretically greater for older children.

Hypothesis

To assess the relationship between single motherhood and children's education in Mexico, I consider a typology of family structure that distinguishes three causes of single motherhood – 1) domestic migration, 2) international migration, and 3) divorce or separation. The resulting analysis focuses on the following two testable hypotheses.

H1: *Causes of single motherhood that are more divisive socially and/or physically (divorce/separation and international migration) are associated with an increased risk of dropping out of school for children relative to less divisive or neutral living arrangements (domestic migration or two-parent), taking into account the socioeconomic characteristics of the household.*

H2: *The increased risk of dropping out for children in single-mother households due to international migration is greater for older (preparatoria-age) children as the social consequences of international migration are more salient.*

Data

To model the educational trajectory of children in Mexico, I employ the Mexican Family Life Survey (MxFLS), a longitudinal survey with the first wave (MxFLS-1) completed in summer of 2002 and the second (MxFLS-2) in summer of 2005 (Rubalcava and Teruel 2006). In terms of the academic calendar, children captured in MxFLS-1 had just completed the 2001-2002 school year. The follow-up wave, MxFLS-2 captured

these same children just after their 2004-2005 school year, resulting in three complete academic years of observation. Importantly, the second wave, MxFLS-2, recorded changes in the enrollment status of children between the two waves, documenting the age and, when known, the date of departure for all sampled children. Overall, MxFLS included 8,440 households in 150 communities and is representative of private dwellings nationally and regionally. Of those sampled in MxFLS-1, 94% were located in MxFLS-2 (Rubalcava, Teruel, Thomas, and Goldman 2007).

All adult members (15+) of the household were interviewed in both waves and members that had left the household were located and re-interviewed. Information on Children (<15) was ascertained via adult members of the household. Up to four relatives/spouses who were residing in the U.S. were identified in the survey for all adult household members. Domestic migration was assumed when a mother identified herself as married or in a stable relationship, but her spouse/partner was neither resident in the household nor resident in the United States.

Sample

The sample used in the following analysis included all children between the ages of 12 and 18 who attended at least some school during those ages and were interviewed in both MxFLS-1 and MxFLS-2. This age range is intended to capture two distinct stages in the educational trajectory of a child in Mexico – *secudaria* and *preparatoria*. *Secudaria*, which is equivalent to middle school in most educational systems, is bounded on either side by age 12 and 14, which are the ages of transition from *primaria* (elementary school) and transition to *preparatoria* (high school). Very few children drop out in *primaria*,

constituting only about 6% of the total number of exits, preventing their inclusion. I also excluded children who were living with no parents or only with fathers in MxFLS-1, about 2% of all children, focusing instead on single-mother and two-parent households. In addition, children of never-married mothers and widowed mothers, each comprising about 2% of the sample were excluded as the implications for children's schooling are distinct (Biblarz and Gottainer 2000), but their numbers were too small to be considered as separate categories. The resulting sample included 3,855 children, 684 of whom left school without graduating between MxFLS-1 and MxFLS-2.

Model

I separated the analysis into two age ranges (12-14; 15-18). Age 15 is the point at which the drop-out rate is the highest, which has been noted in other efforts to longitudinally model the educational trajectory of Mexican students (Kandel 2003). This is the age at which most children transition from middle (*secundaria*) to high school (*preparatoria*) after which education is no longer mandatory and the costs of continued enrollment increase considerably. In this case, approximately 60% of those that left school between the two waves, did so between the ages of 15 and 18.

Considering distinct stages in the educational process in Mexico is crucial for two reasons. First, there is the issue of selectivity. Since 1993, compulsory education has been extended to constitutionally include *secundaria*, but not *preparatoria* (Mier y Teran Rocha and Rabell Romero 2003). Therefore, students who make the transition from *secundaria* to *preparatoria* are transitioning from compulsory to voluntary education, suggesting that they are potentially different than their peers in terms of ability and

motivation. The distinct age pattern of the dropout rate in Mexico supports this assertion, demonstrating a clear spike in the dropout rate at the transition age from *secundaria* to *preparatoria* when a substantial number of children end their educational careers. The period after age 15 is characterized by a decline for much of *preparatoria* with a tapering around age 18 (Kandel 2003). In other words if a child enters *preparatoria*, he/she is increasingly likely to finish as the years go by.

The second reason relates to the social consequences of migration. I hypothesized that one way in which single motherhood due to international migration may influence children's education is through the culture of migration. Because children of migrants may increasingly consider migration to be a possibility as they approach the working ages, I consider older children in non-compulsory education (*preparatoria*) to be particularly vulnerable. To take into account this issue of selectivity and the distinct role of migration for older children, I consider *secudaria* and *preparatoria* to represent separate stages in the educational trajectory of a Mexican child and model them accordingly.

Estimation

To model the educational trajectory, I use discrete time event history analysis (Allison 1982). The risk of dropping out of school, defined as leaving school without graduating from high school (*preparatoria*) by age 18, is modeled as a function of the age of the child (analysis time), the family structure, and a number of additional household and individual characteristics. The period of observation begins with the exact date of the household interview for MxFLS-1, which was collected in the summer of 2002, and

ends with the exact date of interview for MxFLS-2, which was collected starting in the summer of 2005. Some of the follow-up interviews for MxFLS-2 were collected as late as spring of 2006, which means that a number of children have a longer period of observation. Additionally, the ages of observation were bounded by age 12 and age 18. Children younger than 12 at the time of MxFLS-1 contributed to the model only after their 12th birthday if it occurred between the two survey waves. Similarly, children that turned 18 between MxFLS-1 and MxFLS-2 were exited from observation in May of calendar year following their 18th birthday. Overall, this period of observation covers a relatively short period of time, consisting of a maximum of three academic years for a given child.

To model the timing of the event of dropping out, I used age last birthday. In some cases the exact date of leaving school was recorded, however, in most cases only the age of departure was known. As a result, I frequently could not be certain of the exact date of departure, only the age at which it occurred. Because this is structurally not continuous in that I only knew the timing of departure within 12 months, I selected a discrete time approach.

I separately analyzed *secundaria*-age (12-14) and *preparatoria*-age (15-18) children. For the analysis of *secundaria*-age children, I bounded the observations between the age 12 and just before exact age 15. Exact transition ages were not recorded so I selected the expected age of transition, assuming no gaps in the educational trajectory, which is age 12 for transitions into *secundaria* and age 15 for transitions into *preparatoria*. This age categorization is similar to those selected by Kandel (2003) when using retrospective education histories to model the hazard of dropping out in Mexico. An important

attribute of this approach is that children may contribute some years to both the *secundaria* (12-14) and *preparatoria* (15-18) models conditional on continuing being enrolled after age 14. Children who remain in school and turn 15 during the period of observation contribute person-years to both the *secundaria* model, for the period of observation that they are younger than 15, and the *preparatoria* model, for the period of observation that they are older than 15.

An event history approach is advantageous in two ways. Firstly, it allows the inclusion of students who have not yet finished their education by MxFLS-2, maximizing the available information. Only the ages at which they were observed are included in the model after which point they were removed from the analysis (censored) with no bias introduced into the estimates. Secondly, the timing of departure in relation to measure of family structure was of interest. Specifically, I was only interested in the risk of dropping out subsequent to the departure of a father.

This is distinct from cross-sectional approaches that would describe the living arrangements of children not enrolled in school, but cannot determine if the departure from school predated the entrance into single motherhood. Although this approach does not determine causality as measures not included in the model could partly or wholly determine both the event of dropping out and the absence of a father, it does help in that leaving school is unlikely to affect a father's prior departure.

In sum, I used a complimentary log-log model (Box-Steffensmeier and Bradford S. Jones 2004) to separately estimate the hazard of leaving school without graduation for *secundaria*-age children (12-14) and *preparatoria*-age children (15-18). The resulting models are interpreted as the risk of dropping out of school for a given child for a given

year of enrollment, conditional on at least being enrolled at the beginning of the interval. Specifically, for *secundaria*-age children, this is the risk of dropping out in a given year between the ages of 12 and 14, conditional on being enrolled at age 12. For *preparatoria*-age children, this is the risk of dropping out in a given year between the ages of 15 and 18, conditional on being enrolled at age 15.

Variables

Explanatory Variable

The key explanatory variable describes the family structure in terms of single motherhood. It consists of four categories of households: 1) two-parent, 2) single-mother due to domestic migration, 3) single-mother due to international migration, and 4) single-mother due to divorce or separation. Two-parent households are households in which both parents are in residence, defined as having been or planning to be residing physically in the household for 12-months. Single-mother households with non-resident fathers due to migration are determined by either the mother stating that her spouse/partner is in the U.S. (international migrant) or by the mother stating she is married or in a stable relationship, but the husband is not a current resident and not living in the U.S. (domestic migrant). The fourth category of single motherhood, defined by the mother being either divorced or separated, is determined by the mother's stated marital status at MxFLS-1.

It is important to note that the family structure measures are time-invariant, being measured at MxFLS-1 and held constant for the period of observation. Ideally, the presence of the father, particularly in the case of migration, but also in terms of social

interactions between children and divorced or separated fathers, should be included as a time-varying measure. Due to data constraints, I was unable to specify the timing of temporary returns to the household by migrant fathers or periods of relationship reconciliation. In addition, the timing of new migrants between the waves was not known. Therefore, I had to assume that family structure was constant for three academic years.

I consider the assumption of constancy in family structure for the three academic years observed not too unreasonable to significantly bias the results. However, to assess the sensitivity of the results on the basis of the assumptions of time invariance of family structure, I conducted a supplementary analysis for which constancy was only assumed for a single year subsequent to the baseline survey – MxFLS-1. Naturally, this substantially reduced the number of observed drop outs¹. The result of the supplementary analysis showed that the order and direction of the estimated coefficients for the risk of dropping out of school for *secundaria*-age and *preparatoria*-age children in single-mother households due to international migration and separation/divorce relative to children in two-parent households were consistent with the full model. In other words, the results based on an assumption of constancy in family structure for the three academic years between MxFLS-1 and MxFLS-2 are consistent with those obtained when the assumption is limited to a single year, lending confidence to the conclusions.

Control Variables

Four household attributes are introduced to capture the characteristics of the household. All household measures were measured at the baseline (MxFLS-1) and do

¹ For *secundaria*-age children, 74 of the 431 dropouts occurred within 12 months of MxFLS-1

not vary over time. A wealth measure was constructed from a series of questions about the assets possessed by each adult member of the household. The ownership of thirteen asset categories² were queried and the resulting total was used to estimate the wealth for a given household using principle components (Filmer and Pritchett 2001). The index was then standardized to have a minimum of 0 and maximum of 10 and included as a continuous measure. An additional economic variable related to migration is the reception of remittances. Unfortunately, no direct measure of remittance income from migrant fathers in the U.S. or other parts of Mexico was collected in MxFLS. Despite this, the focus of the research is on the role of family structure in educational outcomes. As the majority of households do not have a father in the U.S. and, therefore no remittance relationship, I consider an asset index to capture both the potential economic benefit of migration as well as wealth characteristics of households with no migrant members, allowing me to focus on the independent role of paternal absence. I expect the relationship between household wealth and the risk of leaving school to be negative, reducing the hazard of dropping out, particularly for *preparatoria*-age children who are subjected to greater costs of continued enrollment.

The second household control included was the number of co-resident siblings. This was constructed by summing of the number of individuals in the household that share the same mother and/or father if the father is co-resident. The resulting variable was top coded so that numbers of siblings greater than four were grouped into a single category. The presence of co-resident siblings captures the level of potential competition for social

² Individuals were asked in the following order if they owned a house, additional house, bicycle, motorcycle/truck/car, electric appliance, washer/dryer, domestic appliance, saved assets, heavy/farm machinery, horse/mule/donkey, pig/goat, or chickens.

and financial support. I expect the relationship to be positive, increasing the hazard of school leaving due to increased demand for finite household resources.

The third household characteristic to be included describes the presence of a grandparent in the household. Grandparents were defined as parents and step-parents of a given child's parent. This variable could take two values depending on whether at least one grandparent is co-resident (1) or not (0). Although the presence of a grandparent could potentially provide social and/or financial support in the absence of a parent, previous research has come to mixed results. In general international comparative research has found a negative or neutral relationship between co-resident grandparents and educational achievement for children (Moyi, Pong, and Frick 2004; Marks 2007). Single-country studies in Taiwan (Pong and Chen 2007) and the U.S. (DeLiere and Kalil 2002) have found the presence of a grandparent to be beneficial in some circumstances. As a result, there is no clear negative or positive expectation for the role of grandparents in the educational trajectory of children.

The fourth characteristic of the household included was the reception of a state subsidy for education – *Oportunidades*. This is a cash transfer to families for keeping children enrolled in school. Although initially a program for rural families with children in *primaria* and *secundaria*, in 2001 the program was extended to include families with children enrolled in *preparatoria* (Behrman, Parker, and Todd 2005). The reception of *Oportunidades* is expected to reduce the hazard of dropping out.

Three characteristics of the mother were included – age, level of education, and employment status of the mother. All maternal characteristics were measured at the baseline (MxFLS-1) and do not vary with time. The age of the mother was included as

older mothers may be more experienced parents and it may explain some of the sibling effect as more time has elapsed within which to have children. In both cases having an older mother is expected to reduce the hazard of dropping out of school, controlling for the total number of siblings.

The level of education of the parent, common to any predictive model of educational attainment, was constructed by taking the maximum level of education of the mother. The mother's education was selected as the education level of absent father was unknown for children younger than 15 as they were not directly queried. The resulting value can take one of three values: 1) elementary school (*primaria*) or less, 2) middle school (*secundaria*), and 3) high school (*preparatoria*) or more. Children of better educated mother's are expected to be less likely to drop out of school at all ages and levels of education.

The employment status of the mother was included as it can affect the amount of material resources available to a household as well as the availability of the mother in terms of time. Other research has shown it to be significantly related to the school enrollment of children via increased socioeconomic resources (Giorguli-Saucedo 2006). The variable can take two values with unemployed mothers being the reference category. Children of employed mothers are expected to be less likely to drop out.

One community level control was introduced to distinguish rural from non-rural areas. MxFLS includes 150 communities with a substantial amount of variation in population size, categorized into 5 general types – 100,000+, 15,000 to 100,000, 2,500 to 15,000, and <25000. I collapsed this measure into a dichotomous measure, distinguishing rural

from non-rural by considering communities with less than 2,500 residents³. Children in rural areas, due to some limitations in accessibility, household wealth and distinct employment opportunities, are expected to be associated with an increased risk of leaving school.

In addition to household, parental, and community characteristics, the sex and age of the child were included as individual-level controls. Sex is a dichotomous variable with female as the reference category. As the male advantage in the educational attainment in Mexico has been reduced since the 1960s and in some cases reversed, I do not expect to find significant sex-differences in the risk of dropping out of school (Creighton and Park 2008).

The age of the child is constructed as a continuous variable based on the age at last birthday. Because the hazard of dropping out is known to vary with age (Kandel 2003), age is modeled as time-varying measure, defining the unit of analysis time. Each year of observation for a given child contributed one person-year of exposure to the estimated risk of dropping out. As a result, the interpretation of child's age is the underlying hazard of leaving school for a given child for a given year of life.

Descriptive Statistics

[insert table 2 about here]

³ Two other specifications were considered, retaining the original 5-part categorical and an additional two-part categorical considering communities with less than 15,000 residents to be rural. The results were consistent.

Table 2 reports the distribution of the individual, household, parental, and community characteristics by family structure. Notably, all types of single-mother households report less wealth than the two-parent equivalents, however, children in migrant-sending households, particularly to the U.S., fare better than their divorced/separated peers. In addition, children with a father in the U.S. are much less likely to have a working mother or a co-resident grandparent. In contrast, children in migrant-sending households, both domestic and international, tend to have less educated mothers, with about 63% reporting *primaria* education or less as their highest level of education attained. Children with fathers in the U.S. were particularly disadvantaged in terms of their educational background with only 11% living with mothers who had completed *preparatoria* or higher, compared to between 15% and 20% for all other living arrangements. The implication is that the economic benefit of international migration results in wealthier households than one might expect given the educational background. In contrast, children in single-mother households due to divorce or separation are far more likely to have a working mother, with nearly three quarters reporting a mother in the workforce and are the least likely of all household types to receive state aid in the form of *Oportunidades*.

The vast majority of single-mother households (73%) with a father in the U.S. are found in the most rural areas (<2,500). This is also reflected in the higher proportion of these children receiving state support in the form of *Oportunidades*, which until 2001 was a largely rural program.

Overall, the material and educational resources available to children in single-mother households do not compare favorably with their two-parent peers, but there are

distinctions to be made with categories of single motherhood. Specifically, households with a father in the U.S. tend to be better off than their mother's education or employment status might suggest. Children with divorced or separated mothers are clearly the most economically disadvantaged.

Results

[insert table 3 about here]

Secundaria-age children (12 to 14)

Table 3 reports the estimated coefficients and standard errors of the risk of dropping out of school for *secundaria*-age children. All models include the age of the child as it is the unit of analysis time and is interpreted as the underlying hazard of dropping out. As found elsewhere (Kandel 2003), the risk of dropping out increases throughout the ages of enrollment in *secundaria*, peaking at around age 14. Model 1 shows the baseline association between single motherhood and the risk of dropping out of school. Notably, in this first model, there is no significant association.

The relationship between single motherhood and a child's risk of dropping out remains largely unchanged after the introduction of controls for the presence of a co-resident grandparent and siblings in model 2. As expected, having a grandparent in the household significantly reduces risk of dropping out. In addition, having siblings significantly increases the risk of dropping out, but only in relatively large families (4+ siblings). Children in single-child households (0 siblings) are marginally significantly associated

with an increased risk of leaving school, which was not anticipated, but the relationship ceases to be significant with the inclusion of parental and household characteristics.

Model 3 introduces controls for household wealth, the age of the mother at the baseline (MxFLS-1), her employment status, the household's reception of financial support from the *Oportunidades* program, and all community and remaining individual controls. Controlling for these covariates does not change the estimated relationship between single parenthood and the risk of dropping out reported in model 2.

In regard to the other covariates, children of wealthier families have significantly reduced odds of dropping out of school. In addition, the magnitude of the negative association between having 4+ siblings and the risk of dropping out is halved and the significance greatly reduced, suggesting that wealth differences largely explain the potential negative consequences of a large number of school-age siblings. However, the magnitude and significance of the associated reduced odds of dropping out for children with co-resident grandparents remain virtually unchanged, suggesting that wealth alone does not explain the relationship. In addition, *secundaria*-age children of employed mothers are associated with a reduced risk of dropping out of school, which is consistent with the work of Giorguli-Saucedo (2006). Rural households are also associated with an increased risk of dropping out, but the association disappears with the inclusion of the mother's educational background.

Model 4 includes the mother's level of attained education, which, as expected, is a strong predictor of dropping out. Notably, the associated reduced odds of dropping out for *secundaria*-age children with co-resident grandparents remains almost unchanged in terms of magnitude after the introduction of mother's education, but the level of

significance is reduced. The implication is that the association is not wholly explained by observed measures of socioeconomic status of the household, suggesting that perhaps indicators of social support from grandparents should be considered. Overall no significant relationship between single motherhood and the risk of dropping out was found for *secundaria*-age children.

Differences between distinct categories of single motherhood were as important to the hypothesis as differences between single-mother and two-parent households. I found no significant difference between children with a migrant father in the U.S. and those living with a divorced or separated mother. Although the coefficient estimate for children with a migrant father in the U.S. is relatively large and negative, it is not statistically different from either of the other two types of single parenthood. I also found no significant difference in the risk of dropping out for children who have a migrant father in Mexico and those with a migrant father in the U.S or those living with a divorced or separated mother. Overall, for *secundaria*-age children, I found no significant association between family structure and the risk of dropping out.

[insert table 4 about here]

Preparatoria age children [15 to 18]

Table 4 reports the estimated coefficients and the standard errors of the risk of dropping out of school for children age 15 to 18. The variables are introduced in a sequence identical to the models for younger, *preparatoria*-age children. Model 1 introduces the measures of family structure. In contrasts to the estimates for *secundaria*-

age children, *preparatoria*-age children living in a single-mother household due to international migration and separation or divorce are significantly associated with an increased hazard of dropping out of school relative to their peers in two-parent households. Children in single-mother households due to domestic migration are not statistically distinct from their two-parent peers.

Age is associated with a reduced hazard of dropping out. This contrasts with the pattern for children between the ages of 12 and 14 and is indicative of selectivity as children who transition into *preparatoria* are more likely to graduate and increasingly so as more years of schooling are accumulated. The association between age, which is the underlying hazard of dropping out, remains nearly unchanged with inclusion of controls in model 2, 3, and 4.

After the inclusion of controls for the presence of a grandparent and co-resident siblings in Model 2, the associated increased risk of dropping out for children in single-mother households due to international migration and separation or divorce remains significant and slightly increases in magnitude. As before, children in single-mother households with domestic migrant fathers do not show significant differences in terms of the risk of dropping out relative to two-parent households. Larger families (4+ siblings) are strongly associated with an increased risk of dropping out.

Model 3 includes controls for household wealth, the age of the mother at the baseline (MxFLS-1), her employment status, the household's reception of financial support from the *Oportunidades* program, and all community and individual characteristics. As expected, wealth is associated with a reduced risk of dropping out. The inclusion of the

wealth index in model 4 slightly attenuates the increased risk of dropping out for children in single-mother households due to international migration or separation/divorce.

After the inclusion of the mother's level of education in model 4, the wealth relationship observed in model 3 is no longer significant, but the increased risk of dropping out associated with single motherhood due to international migration and divorce/separation remains nearly unchanged in terms of significance and magnitude. Notably, children in single-parent households due to international migration are particularly disadvantaged as the increased risk of dropping out is nearly 40% greater than that estimated for children in single-mother households due to separation or divorce. This suggests that the negative relationship between certain causes of single motherhood (international migration and divorce/separation) and the risk of leaving school is not explained by differences in socioeconomic status (wealth or educational background).

As before, I am not only interested in differences between single-mother and two-parent households, but also differences between distinct types of single-mother households. I separately tested for differences between each type of single-mother household, finding none. Although children in single-mother households due to international migration and divorce/separation are at greater risk of dropping out relative to their two-parent peers, they are not significantly different from each other or from children in single-mother households due to domestic migration. A lack of association between educational outcomes and the domestic migration of a father has been found in other studies (Kandel 2003). However, the estimated coefficient of single-mother households due to domestic migration is positive, albeit less so than that estimated for children with international migrant fathers or divorced/separated fathers.

In sum, children in single-parent households due to international migration or divorce/separation are at an increased risk of dropping out in *preparatoria* relative to children in two-parent households. Children with a migrant father in the U.S. are particularly disadvantaged. The magnitude of the estimated risk of dropping out for children in single-mother households due to domestic migration falls between two-parent households on the one hand and single-mother households due to divorce/separation on the other, although it is not statistically different from either.

Conclusions

To fully describe the relevance of the empirical results, I refer to the original hypotheses:

H1: *Causes of single motherhood that are more divisive socially and/or physically (divorce/separation and international migration) are associated with an increased risk of dropping out of school for children relative to less divisive or neutral living arrangements (domestic migration or two-parent), taking into account the socioeconomic characteristics of the household.*

I conclude that more divisive forms of paternal separation are indeed associated with an increased risk of dropping out relative to two-parent living arrangements for *preparatoria*-age children. Our findings suggest that the relationship between single motherhood and children's education did not lend itself to a blanket interpretation, requiring clear distinctions to be made about the cause of single-motherhood. I interpret this to mean that physical and/or social distance disrupt the support available to children in two-parent living

arrangements net of socioeconomic characteristics of the mother and household.

This leads to two distinct conclusions.

Firstly, single motherhood due to international migration is similar in terms of a child's risk of dropping out to single motherhood due to separation or divorce. This similarity endures even after the introduction of controls for the wealth of the household and the educational background of the parents, suggesting that the observed negative association is not explained by wealth or parental educational background. This is an important connection in that it suggests it is appropriate to consider international migration within a category of causes defined by the rigidity of the separation of the father (socially and physically), rather than a wholly distinct contributor to the educational success/failure of a child.

This first conclusion requires a number of important caveats. Firstly, although single motherhood due to relationship disruption and international migration demonstrate similarly negative associations, the underlying theoretical mechanisms are distinct. Importantly, both are likely to result in a lack of social support with negative consequences for children's education. However, the economic consequences of migrations, particularly international, are theoretically positive in many instances. Our findings suggest that in the case of Mexico, the social disadvantage may be more consequential than whatever financial/economic benefit a child might receive. This interpretation points toward theoretical mechanisms derived from social consequences inherent to any physical separation as well as those specific to international migration.(Kandel and Kao 2001); (Kandel and Kao 2000).

(Kandel and Kao 2000) In the case of Mexico, the orientation toward migration in the future as an alternative to continued schooling, inspired by exposure to parental, family, and community migration, is likely to be an important additional consideration. As this is contextually specific, rooted in the somewhat unique migratory history between Mexico and the U.S., it suggests that theoretical predictions of the relationship between migration, family structure, and children's schooling need to be firmly linked to the specific migratory context. Comparative work with other sending contexts is required to assess the generalizability of these findings to contexts outside of the U.S.-Mexico migration regime.

The second conclusion refers to differences between single motherhood due to domestic migration and other types of single motherhood. I hypothesized that there would be a gradient of separation with more divisive forms of paternal absence (international migration and divorce/separation) being associated with the greatest risk, two-parent households with the least risk, and children of domestic migrants somewhere in between. For children in single-mother households due to domestic migration, I come to no clear conclusion. Although the overall direction and magnitude of the estimated coefficients suggest that the effect of domestic migration is indeed between the effect of two-parent households on the one hand and the effect of international migration and divorce/separation on the other hand, statistical tests show no statistical difference from either their two-parent or single-parent peers.

Relative to international migration or separation/divorce, single-parent households due to domestic migration are more likely to be heterogeneous group in terms of the nature of paternal absence. I was unable to distinguish relatively proximate domestic moves by a

father from long-distance moves across multiple state lines. These distinctions could be important as they imply different levels of social support depending on the facility of interaction determined by physical proximity and/or cost. Perhaps a more refined measure of domestic migration that better characterized the father's distance and duration of absence from the household would lead to a more definitive conclusion.

H2: *The increased risk of dropping out for children in single-mother households due to international migration is greater for older (preparatoria-age) children as the social consequences of international migration are more salient.*

I conclude that older (*preparatoria*-age) children in single-mother households due to international migration are indeed at an increased risk of dropping out, which is not the case for younger (*secundaria*-age) children who are similarly situated. The protective role of wealth and educational background is similar in terms of significance and magnitude for both younger and older children, suggesting that social consequences, particularly those resulting from a culture of migration to the U.S. are important at older ages. With a nationally representative sample, this supports previous research in and around the city of Zacatecas that found that the disincentive to continued schooling derived from the culture of migration is particularly relevant for older children (Kandel and Kao 2000).

From my perspective, the second social consequence of single motherhood is that of the loss of a socially supportive figure, the father. This would be equally important for children divided by physical distance (international borders) and social distance (divorce or separation), which is supported by the results as both types of living arrangements are

associated with an increased risk of dropping out. The implication is that social support may be particularly important for children in non-compulsory, post-*secundaria* schooling. However, further research is required to better assess the role of social support in non-compulsory education in Mexico.

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Table 1. Types of family structure and their theorized consequences for children's education

Family structure	Cause of father's absence	Economic consequence	Social consequences	Net effect
Single mother	Domestic Migration	Positive	Negative/Neutral	Ambiguous
Single mother	International Migration	Positive	Negative	Ambiguous
Single mother	Separation/Divorce	Negative	Negative	Negative
Two parent	NA	Positive	Positive	Positive

Table 2. Comparing household, parental, community, and individual characteristics by household type

Household type:	Two-parent household	Single-mother household		
		<i>Migrant father in Mexico</i>	<i>Migrant father in U.S.</i>	<i>Divorce or separation</i>
Reason for absent father:				
Family structure:				
1+ co-resident grandparent:				
<i>No</i>	90.6%	84.4%	90.9%	80.5%
<i>Yes</i>	9.4%	15.6%	9.1%	19.5%
co-resident sibling:				
0 co-resident siblings	4.5%	12.0%	4.2%	6.2%
1 co-resident sibling	22.3%	19.3%	17.5%	31.1%
2 co-resident siblings	34.9%	33.3%	40.6%	30.7%
3 co-resident siblings	22.0%	19.8%	20.3%	20.3%
4+ co-resident siblings	16.3%	15.6%	17.5%	11.6%
Wealth index	5.83 (2.19)	5.13(1.98)	5.27(2.41)	4.66(1.77)
Parental/Household characteristics:				
Mother is employed				
<i>No</i>	73.5%	56.8%	81.1%	27.0%
<i>Yes</i>	26.5%	43.2%	18.9%	73.0%
Receives Oportunidades				
<i>No</i>	75.8%	71.4%	63.6%	83.0%
<i>Yes</i>	24.2%	28.6%	36.4%	17.0%
Mother's age 2002	38.36(6.66)	37.75(6.29)	36.30(5.56)	38.80(6.59)
Mother's level of education				
<i>Primaria or less</i>	58.2%	63.0%	62.9%	54.8%
<i>Secundaria</i>	26.1%	18.2%	28.0%	26.1%
<i>Preparatoria or more</i>	15.7%	18.8%	9.1%	19.1%
Community characteristics:				
Rural population				
<i>No</i>	54.5%	52.1%	26.6%	68.0%
<i>Yes (<2,500 residents)</i>	45.5%	47.9%	73.4%	32.0%
Individual characteristics:				
Sex				
<i>Female</i>	50.7%	53.6%	55.2%	54.4%
<i>Male</i>	49.3%	46.4%	44.8%	45.6%
Age at entrance into observation				
12	57.7%	55.2%	59.4%	58.9%
13	11.6%	8.3%	11.9%	11.6%
14	9.8%	10.9%	8.4%	10.0%
15	8.4%	4.7%	7.7%	7.5%
16	5.3%	6.8%	4.9%	3.7%
17	4.7%	9.9%	4.2%	5.0%
18	2.5%	4.2%	3.5%	3.3%
n	3,279	192	143	241
# of children dropping out	565	39	29	51

source: MxFLS-1 and MxFLS-2

Table 3. Complimentary log-log regression of the hazard of dropping out of school during *secundaria* (age 12 to 14) on family structure and other demographic characteristics

	Model 1	Model 2	Model 3	Model 4
	β (se)	β (se)	β (se)	β (se)
Family structure:				
Two parent household (<i>ref.</i>)	-	-	-	-
Single mother, migrant father in Mexico	0.21 (0.30)	0.23 (0.29)	0.27 (0.30)	0.25 (0.30)
Single mother, migrant father in U.S.	-0.33 (0.41)	-0.39 (0.42)	-0.51 (0.41)	-0.49 (0.41)
Single mother, separated/divorced	0.01 (0.26)	0.09 (0.27)	0.25 (0.28)	0.28 (0.28)
1+ co-resident grandparent ($I=yes$)		-0.47 (0.25) *	-0.50 (0.26) *	-0.49 (0.26) +
Number of co-resident siblings				
0		0.52 (0.28) +	0.42 (0.29)	0.42 (0.29)
1		0.04 (0.19)	0.07 (0.19)	0.15 (0.19)
2 (<i>ref.</i>)		-	-	-
3		0.25 (0.19)	0.14 (0.20)	0.08 (0.20)
4+		0.71 (0.18) ***	0.46 (0.20) *	0.33 (0.19) +
Parental/Household characteristics:				
Mother is employed ($I=yes$)			-0.35 (0.18) *	-0.27 (0.17)
Receives Oportunidades ($I=yes$)			0.17 (0.16)	0.11 (0.16)
Mother's age 2002			-0.08 (0.08)	-0.06 (0.08)
Mother's age 2002 squared			0.00 (0.00)	0.00 (0.00)
Wealth index			-0.07 (0.03) *	-0.02 (0.03)
Mother's level of education				
<i>Primaria</i> or less (<i>ref.</i>)				-
<i>Secundaria</i>				-0.70 (0.20) ***
<i>Preparatoria</i> or more				-1.59 (0.39) ***
Community characteristics:				
Rural ($I=yes$)			0.34 (0.17) *	0.26 (0.16)
Individual characteristics:				
Sex ($I=male$)			0.09 (0.13)	0.11 (0.13)
Age (<i>time varying</i>)	0.65 (0.09) ***	0.65 (0.09) ***	0.68 (0.09) ***	0.67 (0.09) ***
Log pseudolikelihood	-1022.23	-1010.61	-994.35	-975.54
Person-years observed	6181	6181	6181	6181
Number of children dropping out	253	253	253	253

note: Robust standard errors are used, clustered by household to account for co-resident children.

All variables measured at baseline (MxFLS-1) with the exception of age, which varies with time.

source: MxFLS-1 and MxFLS-2

+p<0.1, *p<0.05, **p<0.01, ***p<0.001

Table 4. Complimentary log-log regression of the hazard of dropping out of school during *preparatoria* (age 15 to 18) on family structure and other demographic characteristics

	Model 1		Model 2		Model 3		Model 4	
	β	(se)	β	(se)	β	(se)	β	(se)
Family structure:								
Two parent household (<i>ref.</i>)	-		-		-		-	
Single mother, migrant father in Mexico	0.18	(0.21)	0.23	(0.21)	0.21	(0.21)	0.26	(0.21)
Single mother, migrant father in U.S.	0.64	(0.25) *	0.71	(0.24) **	0.66	(0.24) **	0.63	(0.24) **
Single mother, separated/divorced	0.37	(0.19) *	0.44	(0.19) *	0.42	(0.21) *	0.45	(0.22) *
1+ co-resident grandparent (<i>I=yes</i>)			-0.20	(0.18)	-0.24	(0.18)	-0.23	(0.18)
Number of co-resident siblings								
0			-0.07	(0.26)	-0.13	(0.26)	-0.16	(0.26)
1			0.18	(0.14)	0.15	(0.15)	0.20	(0.15)
2 (<i>ref.</i>)			-		-		-	
3			0.26	(0.14) +	0.21	(0.15)	0.16	(0.15)
4+			0.78	(0.15) ***	0.64	(0.16) ***	0.52	(0.16) ***
Parental/Household characteristics:								
Mother is employed (<i>I=yes</i>)					-0.11	(0.12)	-0.02	(0.12)
Receives Oportunidades (<i>I=yes</i>)					0.00	(0.15)	-0.01	(0.14)
Mother's age 2002					-0.14	(0.07) *	-0.13	(0.07) +
Mother's age 2002 squared					0.00	(0.00) *	0.00	(0.00) +
Wealth index					-0.07	(0.02) **	-0.02	(0.03)
Mother's level of education								
<i>Primaria</i> or less (<i>ref.</i>)							-	
<i>Secundaria</i>							-0.57	(0.14) ***
<i>Preparatoria</i> or more							-1.24	(0.23) ***
Community characteristics:								
Rural (<i>I=yes</i>)					0.12	(0.12)	0.05	(0.12)
Individual characteristics:								
Sex (<i>I=male</i>)					0.15	(0.10)	0.14	(0.10)
Age (<i>time varying</i>)			-0.27	(0.05) ***	-0.26	(0.05) ***	-0.24	(0.05) ***
Log pseudolikelihood	-1400.87		-1382.80		-1371.55		-1345.68	
Person-years observed	4530		4530		4530		4530	
Number of children dropping out	431		431		431		431	

note: Robust standard errors are used, clustered by household to account for co-resident children.

All variables measured at baseline (MxFLS-1) with the exception of age, which varies with time.

source: MxFLS-1 and MxFLS-2

+p<0.1, *p<0.05, **p<0.01, ***p<0.001